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**Topic: Twins**

### **Twins**

Twins are two offspring produced by the same pregnancy. Twins can be either *monozygotic* ('identical'), meaning that they develop from one zygote, which splits and forms two embryos, or *dizygotic* ('non-identical' or 'fraternal'), meaning that each twin develops from a separate egg and each egg is fertilized by its own sperm cell.

#### **Types and zygosity:**

The vast majority of twins are either dizygotic (fraternal) or monozygotic (identical).

Fraternal twins can be any of the following:

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- Female–female twins: Sometimes called sororal twins (25%)
  - Male–male twins: Sometimes called fraternal twins (25%)
  - Male–female twins: This is the most common pairing (50%)

**Dizygotic (fraternal) twins:**

Dizygotic (DZ) or fraternal twins (also referred to as "non-identical twins", "dissimilar twins", "biovular twins", and, informally in the case of females, "sororal twins") usually occur when two fertilized eggs are implanted in the uterus wall at the same time.

When two eggs are independently fertilized by two different sperm cells, fraternal twins result. The two eggs, or *ova*, form two zygotes, hence the terms *dizygotic* and *biovular*.

Fraternal twins are essentially, two ordinary siblings who happen to be born at the same time, since they arise from two separate eggs fertilized by two separate sperm, just like ordinary siblings. This is the most common type of twin.

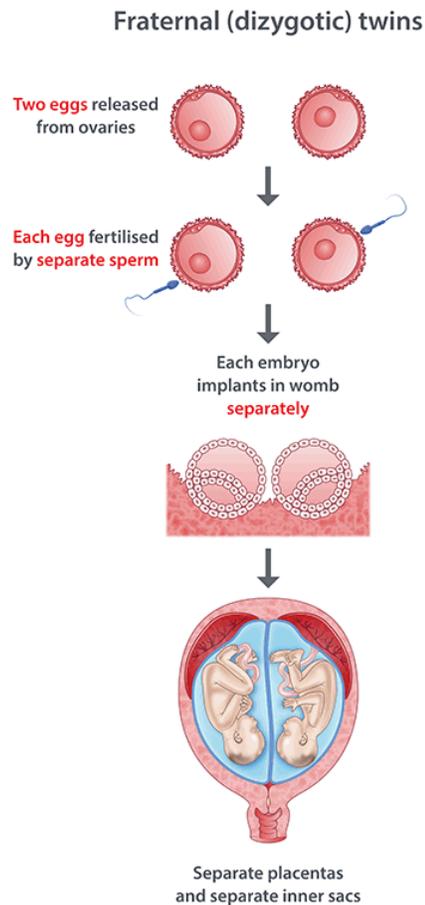
Dizygotic twins, like any other siblings, will practically always have different sequences on each chromosome, due to chromosomal crossover during meiosis.

Dizygotic twinning ranges from six per thousand births in Japan to 14 and more per thousand in some African countries.

Dizygotic twins are also more common for older mothers, with twinning rates doubling in mothers over the age of 35. With the advent of technologies and techniques to assist women in getting pregnant, the rate of fraternal has increased markedly.

**Monozygotic (identical) twins:**

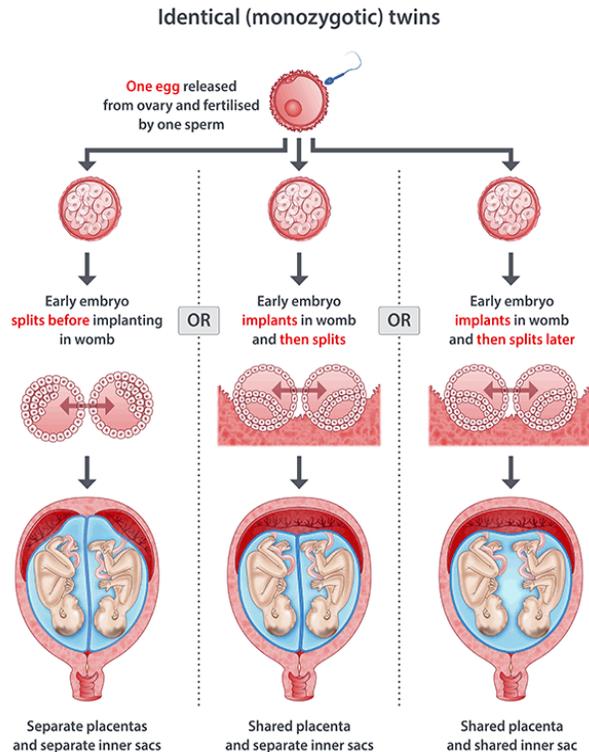
Monozygotic (MZ) or identical twins occur when a single egg is fertilized to form one zygote (hence, "monozygotic") which then divides into two separate embryos.



### **Mechanism:**

Regarding spontaneous or *natural* monozygotic twinning, a recent theory proposes that monozygotic twins are probably formed when a blastocyst contains two inner cell masses (ICM), each of which will lead to a separate fetus, rather than by the embryo splitting while hatching from the zona pellucida.

Monozygotic twins may also be created artificially by embryo splitting. It can be used as an expansion of in vitro fertilization (IVF) to increase the number of available embryos for embryo transfer.



### Incidence:

Monozygotic twinning occurs in birthing at a rate of about 3 in every 1000 deliveries worldwide.

The likelihood of a single fertilization resulting in monozygotic twins is uniformly distributed in all populations around the world.

IVF techniques are more likely to create dizygotic Twins.

### Degree of separation:

The degree of separation of the twins in utero depends on if and when they split into two zygotes. Dizygotic twins were always two zygotes. Monozygotic twins split into two zygotes at some time very early in the pregnancy.

The timing of this separation determines the chorionicity (the number of placentae) and amniocity (the number of sacs) of the pregnancy. Dichorionic twins either never divided (i.e. were dizygotic) or they divided within the first 4 days. Monoamniotic twins divide after the first week.

In very rare cases, twins become conjoined twins. Non-conjoined monozygotic twins form up to day 14 of embryonic development, but when twinning occurs after 14 days, the twins will likely be conjoined.

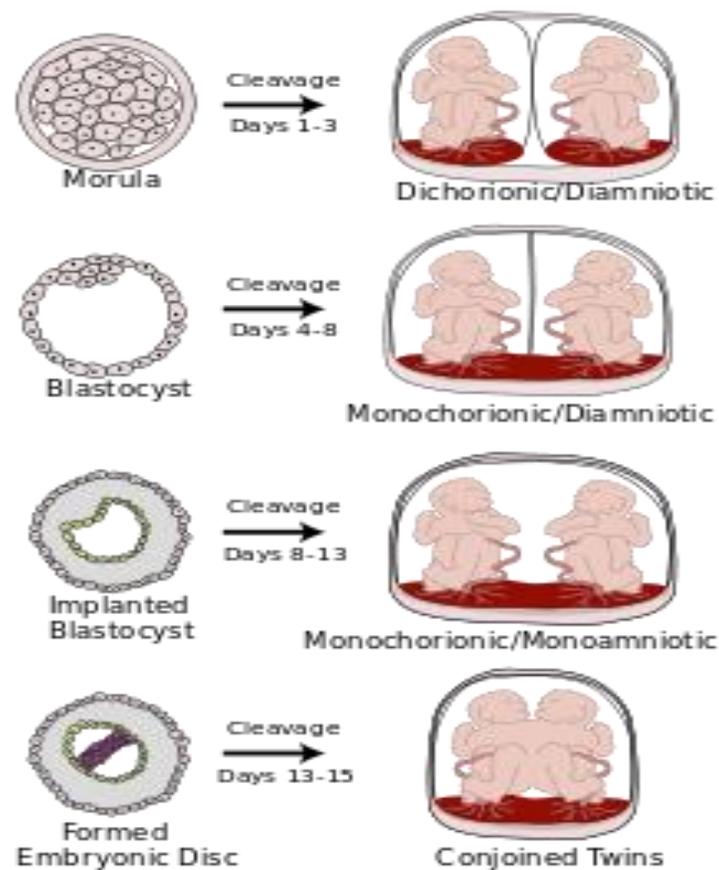


Fig: Various types of chorionicity and amniosity (how the baby's sac looks) in monozygotic (one egg/identical) twins as a result of when the fertilized egg divided.

**Predisposing factor:**

The predisposing factors of monozygotic twinning are unknown.

Dizygotic twin pregnancies are slightly more likely when the following factors are present in the woman:

- Women are of West African descent.
- Women between the age of 30 and 40 years.
- Women are greater than average height and weight.
- Women have had several previous pregnancies.

Women undergoing certain fertility treatments may have a greater chance of dizygotic multiple births. In the United States it has been estimated that by 2011, 36% of twin births resulted from conception by assisted reproductive technology.

The risk of twin birth can vary depending on what types of fertility treatments are used. Within (IVF), this is primarily due to the insertion of multiple embryos into the uterus. Ovarian hyperstimulation without IVF has a very high risk of multiple births.

**Complications during pregnancy:****Vanishing twins:**

Researchers suspect that pregnancies start out as multiples, but only a single fetus is brought to full term, because the other fetus has died very early in the pregnancy and has not been detected.

Early ultrasonography exams sometimes reveal an "extra" fetus, which fails to develop and instead disintegrates and vanishes in the uterus. There are several reasons for the "vanishing" fetus, including it being embodied or absorbed by the other fetus, placenta or the mother. This is known as vanishing twin syndrome.

### **Conjoined twin:**

Conjoined twins (or the once-commonly used term "siamese") are monozygotic twins whose bodies are joined together during pregnancy. This occurs when the zygote starts to split after day 12 following fertilization and fails to separate completely. This condition occurs in about 1 in 50,000 human pregnancies.

Most conjoined twins are now evaluated for surgery to attempt to separate them into separate functional bodies. The degree of difficulty rises if a vital organ or structure is shared between twins, such as the brain, heart or liver.

### **Twin-twin transfusion syndrome:**

Identical twins who share the same placenta and chorion can sometimes share a condition called twin–twin transfusion syndrome (TTTS). In this condition, blood flows from one twin to the other, resulting in one baby getting too much blood and the other baby not getting enough. This affects the health of both babies, sometimes severely.

## Difference Between Identical And Fraternal Twins

<b>Identical Twins</b>	<b>Fraternal Twins</b>
A single zygote splits into two parts and develops into different embryos.	Two eggs are fertilized by two different sperms.
The genetic origin is the same and has the same DNA.	The twins share 50% of their genetic traits.
They are of the same sex.	The sexes may be the same or different.
They share the same blood type.	The blood types may or may not be the same.
They may or may not be dichorionic and diamniotic.	They are dichorionic and diamniotic.
Their personalities are complementary and dependent.	Their personalities may be similar or different.